TABLE A2-continued

	Conv.	FIGS. 1–4	FIGS. 5–8
Axial Slot Length [mm]	294	460	350
Total No. of Slots	2622	10051	3059
Effective Open Area [m^2]	0.0257	0.0402	0.0306
Effective Open Area [%]	3.18%	4.98%	3.79%
Improvement over Conventional [%]	—	56%	19%

From these tables, it will be appreciated that the effective open area of both screen cylinders of the embodiments hereof illustrated in FIGS. 1–4 and 5–8, respectively, have substantially increased hydraulic capacity in comparison with a correspondingly sized conventional cylinder with identically contoured slots. This is evident, for example, from the increases in effective open area of the slots of the screen cylinders hereof and particularly the substantial increase in open area of the cylinder of FIGS. 1–4 preferably used for low consistency pulps.

The following Table B represents a comparison of the strength of the cylinders hereof and a conventional cylinder of the same dimensions, slot width and pitch. Particularly the strength is given in terms of the deformation of a ridge between the slots in directions radially outwardly or inwardly and tangential of the screen cylinder, respectively, in response to a force applied radially from within or from outside the cylinder. In this example, the force applied is 100 kPa and 100% perfect contact between the inner and outer screen members is assumed.

TABLE B

Deformation (mm)	Conventional	FIGS. 1–4	FIGS. 4–8
Radial	0.340	0.200 (59%)	0.006 (2%)
Tangential	3.23	0.10 (3%)	0.06 (2%)

Thus, the deformation of the present cylinders is much less than in the conventional cylinders and is considerably less in the high strength cylinder of FIGS. 5–8 which is used preferably for screening high consistency pulp. The overall strength of both embodiments of cylinders hereof is therefore substantially increased in comparison with a conventionally formed cylinder of the same size with identical slot width and pitch.

It will be appreciated that, by the foregoing described method, fabrication costs and times are substantially reduced in comparison with the prior methods previously described. Additionally, this method enables approximately 20% to 80% greater effective screen area than afforded by screen plates manufactured by previous methods, while simultaneously affording increased strength. The capability of replacing only the screening plate portion of the screen cylinder whereby screen cylinder replacement costs is also afforded, together with the foregoing noted advantages.

While the invention has been described in connection with what is presently considered to be the most practical and preferred embodiment, it is to be understood that the invention is not to be limited to the disclosed embodiment, but on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims.

What is claimed is:

1. A screen cylinder comprising:

a generally cylindrical screening medium having a plurality of openings therethrough;

a generally cylindrical structural backing plate for structurally supporting said screening medium and having a plurality of openings therethrough; and

said screening medium and said structural backing plate lying concentrically one within the other and having respective opposed surfaces in engagement with one another at an interface therebetween whereby said backing plate structurally supports said screening medium;

one of said screening medium and said backing plate having a plurality of circumferentially extending recesses formed in its opposing surface and opening at the opposing surface of the other of said screening medium and said backing plate at the interface thereof establishing communication between the respective openings of said screening medium and said backing plate;

a plurality of axially spaced projections spaced one from the other in the axial direction defining said recesses and projecting radially from one of said screening medium and said backing plate at said interface;

the openings in said screening medium being elongated and extending in a generally axial direction substantially normal to the circumferential extent of said recesses.

2. A screen cylinder according to claim 1 including means for releasably connecting said screening medium and said backing plate one to the other.

3. A screen cylinder according to claim 2 wherein said connecting means includes welding said screening medium and said backing plate to one another.

4. A screen cylinder according to claim 2 wherein said connecting means includes gluing said screen medium and said backing plate one to the other.

5. A screen cylinder according to claim 2 wherein said connecting means includes soldering said screen medium and said backing plate one to the other.

6. A screen cylinder according to claim 1 wherein said recesses are formed in the surface of said screening medium.

7. A screen cylinder according to claim 6 including rivets for releasably connecting said screening medium and said backing plate one to the other.

8. A screen cylinder according to claim 1 wherein said recesses extend axially at least plural times the axial extent of said projections, said openings in said screening medium having an extent sufficient to span in the axial direction two or more recesses.

9. A screen cylinder according to claim 1 wherein said recesses are formed in the surface of said backing plate.

10. A screen plate for screening pulp flowing therethrough comprising:

a screening medium having a plurality of slots therethrough and extending generally parallel to one another, said slots having contoured portions on an inflow side of said screening medium;

a structural backing plate having a plurality of openings therethrough;

said screening medium and said structural backing plate lying in registration one with the other and having respective opposed surfaces in engagement with ne another at an interface therebetween whereby said backing plate structurally supports said screening medium;

one of said screening medium and said backing plate having a plurality of recesses formed in its opposing surface and opening at the opposite surface of the other of said screening medium and said backing plate at the interface thereof establishing communication between the openings of said backing plate and said slots of said screening medium; whereby pulp may flow sequentially through said slots, said recesses and said openings in said backing plate.

11. A screen plate according to claim 10 wherein said screening medium and said backing plate are cylindrical and lie one within the other, said recesses extending circumferentially and substantially uninterruptedly about said one of said screening medium and said backing plate, said slots in said screening medium extending in a generally axial direction and in a direction substantially normal to the circumferential extent of said recesses.

12. A screen cylinder according to claim 11 wherein said slots have an extent sufficient to span, continuously and without interruption, in the axial direction two or more recesses.

13. A screen cylinder according to claim 11 wherein said cylindrical screening medium has elongated outflow slots formed in the opposing surface of said screening medium in radial registry with said contoured slot portions and substantially coextensive therewith, reduced slots in registry with said contoured slot portions and said outflow slots and communicating therebetween, said recesses and said contoured slot portions being formed on the inflow sides of said backing plate and said cylindrical screening medium, respectively, whereby pulp may flow sequentially through said contoured slot portions, said reduced slots and said outflow slots of said screening medium and then through said recesses and said openings of said backing plate.

14. A screen cylinder according to claim 11 wherein said cylindrical screening medium has reduced slots in registry with said contoured slot portions and in communication therewith, said contoured slot portions and said recesses being formed on inflow and outflow sides of said screening medium, respectively, whereby pulp may flow sequentially through said contoured slot portions, said reduced slots, and said recesses of said screening medium and then through said openings of said backing plate.

15. A screen cylinder according to claim 10 including means for releasably connecting said cylindrical screening and said backing cylinder one to the other.

16. A screen plate according to claim 10 wherein said recesses are formed in the opposing surface of said screening medium.

17. A screen plate according to claim 10 wherein said recesses are formed in the surface of said backing plate.

18. A method of manufacturing a screen for use in screening for pulp, said screen being formed of a screening plate and a backing plate, said screening plate having first and second opposite faces, comprising the steps of:

(a) forming elongated, substantially parallel, grooves in said first face, each groove having a side face and a bottom;

(b) forming openings through the bottom of the grooves in said first face and into the screening plate to terminate within the screening plate short of said second face thereof;

(c) forming elongated grooves in the second face of said screening plate inclined relative to the longitudinal extent of the grooves formed in step (a) and to a depth to expose the openings formed in step (b) so that the openings extend entirely through said screening plate, and leave a plurality of ridges in the second face spaced one from the other thereabout and extending in a direction inclined relative to the longitudinal extent of said grooves.

19. A method according to claim 18 wherein said screening plate is formed of metal.

20. A method according to claim 19 including, subsequent to steps (a), (b) and (c), hardening or plating the metal of said screening plate.

21. A method according to claim 18 wherein said screening plate is formed of a ceramic.

22. A method according to claim 18 including machining the first face of the screening layer to form ridges flat on one side and angled on the opposite side.

23. A method according to claim 18 including the step of forming the screening plate into a cylindrical shape to form a metal screen cylinder.

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